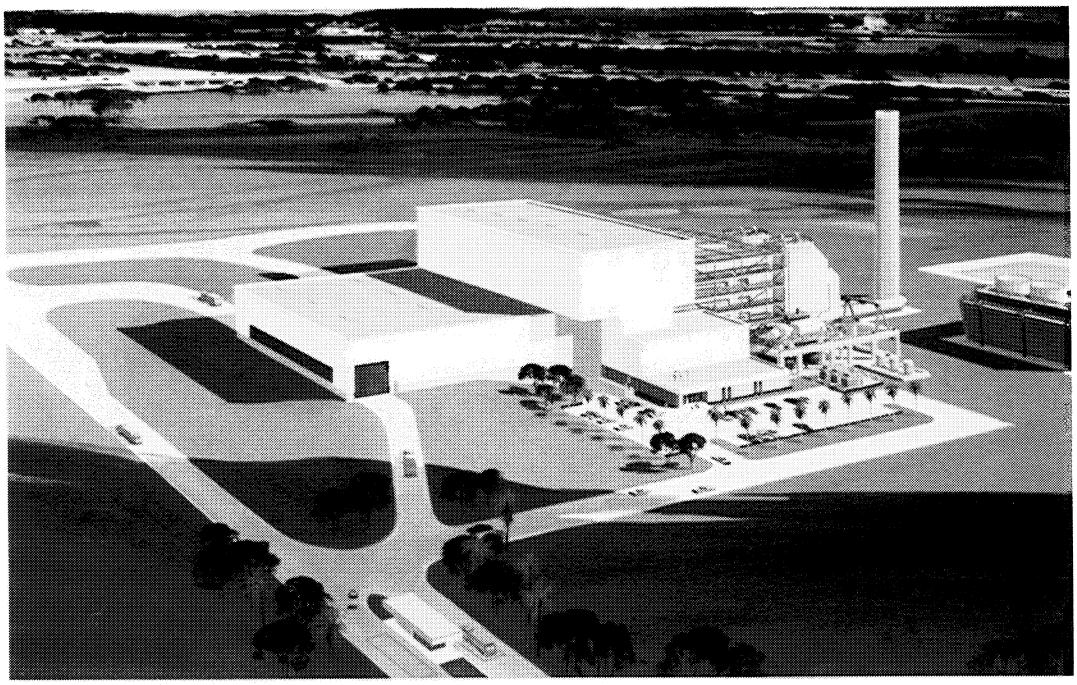
Energy Recovery



Millions of tons of waste are generated annually in the United States and municipalities face mounting problems of disposing of the waste in an economical, environmentally safe manner. A solution widely applied in Europe and being increasingly adopted by American communities is "Waste-to-Energy," incinerating the refuse and using the steam produced by trash burning to drive an electricity producing generator.

One company specializing in Waste-to-Energy is Blount Energy Resources Corporation, a division of Blount, Inc., Montgomery, Alabama. Blount designs and builds energy recovery facilities using technology developed by Widmer + Ernst, Zurich, Switzerland. Such technology includes an innovative horizontal grate, special boiler configurations and an extra-efficient ash removal system that combine to achieve nearly complete incineration of municipal waste. An example of a Blount/Widmer + Ernest facility design is the Solid Waste Processing Project plant in San Juan, Puerto Rico shown above.

Although the basic technology applies to any facility, construction of a Waste-to-Energy plant requires a customized design for each community that takes into account such variables as the amount of waste available, power requirements, transportation patterns and seasonal fluctuations in trash availability. Blount Engineers, Inc., which handles plant design for Blount, Inc., must know how much electricity can be generated from the refuse under many different conditions of trash composition, full or part load operation, and local climate. This requires detailed computer calculations of power train balance.

For such calculations, Blount Engineers first use a Control Data computer program called Syntha III, Power Plant Design, for making preliminary calculations for the entire plant, including boilers, turbines, heaters and condensers. For the highly detailed heat balance around the turbine heat cycle proper, Blount relies on NASA's PRESTO II, Performance of Regenerative Superheated Steam Turbine Cycles. PRESTO provides the power engineers with the ability to model such features as process steam extraction, induction and feedwater heating by external sources, peaking and high back pressure. Expansion line efficiencies, exhaust loss, leakage, mechanical losses and generator losses are used to calculate the cycle heat rate and the generator output. The program is sufficiently precise that it can be used to verify performance quoted in turbine generator suppliers' proposals.

The PRESTO II software package was supplied to Blount Engineers by NASA's Computer Software Management and Information Center (COSMIC)®. A unit of NASA's technology transfer network, COSMIC collects and stores government-developed computer programs that have secondary applicability and makes them available to industrial firms and other organizations (see page 122). ▲

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